## **Cloud Computing** Special Interest Group

Cloud Computing for the UK Research Community Workshop 28-29 December 2013

Philip Kershaw, STFC Rutherford Appleton Laboratory

#### Overview

- Who is the Cloud SIG?
- Why and why now?
- Workshop structure
- Desired outcomes

## **Cloud SIG Committee Members**

- David Blundell, 100 Percent IT
- John Chapman, JANET
- Neil Chue-Hong, Software Sustainability Institute
- David Colling, Imperial College
- David Fergusson, Crick Institute
- Roger Jones, CERN
- Philip Kershaw, STFC Rutherford Appleton Laboratory (chair)
- David Wallom, Oxford e-Research Centre
- Jeremy Yates, UCL

# Origins

- Formed as a follow up from e-Infrastructure Project Directors Group meeting, July this year
  - Identified key areas where it was felt there could be benefit from greater co-ordination
  - e.g. cloud computing, identity management and access control . . .
- The SIG is an independent group
- A second incarnation
  - Original SIG co-ordinated by Neil Chue Hong (SSI) and Jeremy Cohen (Imperial College)

# Why?

- Too many SIGs already?
- The effectiveness of a SIG:

- the need to actively create, co-ordinate and enable

- We seek to have a direct link with and support projects which are already underway in this space
- There is much existing work in this area already
  - Reports: Magellan (DoE 2011), Cloud Computing for Research (JISC, 2010), ...
- But it is a fast moving area with new challenges

## **Challenges and Opportunities**

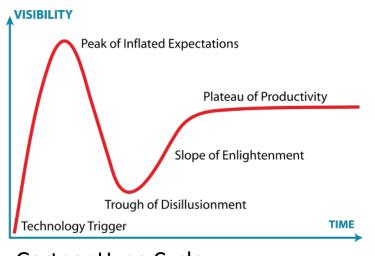
	plication of Cloud
Computing in the	UK Research
Community	
David Blandell, 100 Barcont IT	
ohn Chaoman IANET	
sell Class Heng, Software Sustainabl	lity Isstitute
David Colling, Imperial College David Fergusson, Crick Institute	
Reper loan, CERN	
hilp Kershaw, STFC Ratherford Ap	eleten Laberatory
David Wallom, Oxford e-Research Ce	ntre
ereny Yates, UCL	
Executive Summary	
	disruptive technology [1]. It is bringing
bout significant shifts in the way da	ta and computing resources are managed
	to transform the way research is conducted
n terms of scale, flexibility and cost. round the issues of ownership, trus	Equally it raises fundamental questions t, security and availability.
Motivation	
	tion of Cloud Computing in the context of the to highlight the potential benefits, identify
he current problem areas and provi	do recommendations on how that potential
an best be realised to inform policy	
echnology. This version is intended omorehousive and detailed study.	f as an initial summary ahead of a more
Luthorship	mbers of the Cloud Computing Special
	roup established to foster collaboration and
stablish best practice for the applica	ation of Cloud Computing in the UK research
	rship drawn from a range of research
fomains, from infrastructure provid- ire actively involved in the technical	ers and representatives from industry who application of cloud technologies.
Current Context and Prior Work	
	Cloud Computing and the related terms is out
	ammary is included as an appendix. This is of the reports listed in the References
ection. We recornise the large body	of existing work in this area, notably the
loud Computing for Research report	t commissioned by [ISC in 2010 [2] and the
IS DOE Magellan Report [4], which p	provides an extensive review of the
	1

Cloud SIG Executive Summary

- The challenges of *Big Data* are impacting on a wider set of communities within the research domain.
  - Cloud computing provides *one* solution to tackle these challenges the ability to
    - to scale out compute and storage
    - to bring users to data through the provision of hosted processing and analysis environments at data centres
- Opportunities provided through recent investment from UK government in e-Infrastructure
- Increased maturity of software for private cloud provision (e.g. OpenStack and vCloud)
- Increased availability of pre-packaged Virtual Appliances for scientific computing (e.g. Galaxy CloudMan)

#### **Issues to Address**

. . .



Gartner Hype Cycle

- Standardisation of interfaces
  - multiple competing standards, a lack of standards, incomplete standards or existing standards with insufficient uptake
  - SLAs and charging models
    - need for greater understanding, education for users
    - Difference between commercial and research funding models
    - Can public providers make custom SLA arrangements for research sector?
- Danger of fragmentation within research community
  - Bespoke solutions developed for generic problems

#### Terms of Reference

The SIG has a number of goals as follows:

- To establish best practice for the application of cloud computing in the UK research community
- Share this best practice and provide recommendations where needed
- *Execute* these recommendations
- Focus work around *existing projects* in the research community to ensure a direct connection to practical application of cloud technologies.
- Co-ordinate efforts and foster collaboration across research communities seeking to avoid domain-specific solutions

## Workshop Structure

- Structured around three themes
  - Public cloud
    - How can research users best exploit public cloud resources?
    - Give provider and consumer perspectives
  - Private cloud
    - A number of organisations from the research sector are considering or in the process of rolling out a private cloud
    - How can a cloud best integrate with existing infrastructure and functions? - data centre, HPC, hosted processing and analysis environments
  - Cloud federation and brokering
    - What are the opportunities that are offered from procuring resources from multiple providers?
    - What are the technical and policy-related challenges?
    - Can brokers support the user community to get the best service?

#### **Outcomes from Workshop**

- Identify a set of themes, common problem areas
- Select priority areas
- Use pilot projects as practical vehicles to

   explore these and find solutions or
   provide momentum for solutions
- These should be existing projects already running or planned in the research community
- Provide a single voice to lobby for change
- (to explore further in final session tomorrow)

## Summary

- Public cloud
  - Ability to massively scale-out
  - Immediate availability
  - Trust
  - WAN b/w data in / data out
  - Service models and SLA that fits the research community's needs
- Federation and brokering
  - Technical:
    - opportunity to select from a range of providers with a common interface
    - technical challenges, evolving capability
  - Policy: possibility of collective bargaining
- Private cloud
  - Capex vs. opex with open source vs. proprietary
  - Complexity in deployment, available features, stability
  - Licensing
  - Trajectory of s/w vendor be it open source or proprietary

#### Next Steps

- SMART objectives
  - Specific, Measurable, achievable, realistic, time-bound
- What common themes do we have across the community?
  - Private cloud expertise
  - Hybrid and federation: APIs, virtual appliance portability
  - Charging models, SLAs
- Training
  - Help users Making cloud friendly tools
- Policy-based?
- Technical?
  - Document tech best practice to eliminate misunderstanding about what cloud can and can't do
- What assets do we have as SIG?
  - collective input and co-ordination
  - Exchange of expertise and best practice
- Know who your users are
  - IaaS and PaaS, SaaS are different users: admins, developers/researchers, end users
- SIG put proposals BUFDG (British Universities Finance Directors Group)
  - Best practice about financing cloud computing for research